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(A) forming a first population of mixture entities and detecting a catalytic property of each of said entities by a high throughput screening (HTS) method and

(B) executing a genetic algorithm based on said property of said entities to identify a second population of entities.

A3 SUB 33  
3. AMENDED The method of claim 1, comprising randomly identifying said first population of entities prior to forming said first population according to step (A).

SUP B4

6. " The method of claim 1, further comprising generating a binary string representing variable parameters of entities, forming said entities and selecting said first population from said entities and step (B) comprises executing a genetic algorithm with a processor on said binary string to produce a binary string representing said second population of entities.

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7. " The method of claim 1, further comprising generating a binary string representing variable parameters of entities, forming said entities, evaluating said entities for a desired property, weighting said entities according to an hierarchy of fitness of said property and selecting said first population as a sampling from said weighed entities and step (B) comprises executing a genetic algorithm with a processor on said binary string to produce a binary string representing said second population of entities.

8. " The method of claim 1, further comprising generating a binary string representing variable parameters of entities, forming said entities, evaluating said entities for a desired property, pairing said entities and (B) comprises executing a genetic algorithm with a processor on said binary string to produce a binary string representing said second population of entities.

9. " The method of claim 1, further comprising generating a binary string representing variable parameters of entities, forming said entities, evaluating said entities for a desired property and pairing said entities and (B) comprises executing a genetic algorithm

comprising a uniform random crossover operator to produce a binary string representing said second population of entities.

10. <sup>AMENDED</sup>

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The method of claim 1, further comprising generating a binary string representing variable parameters of entities, forming said entities, evaluating said entities for a desired property, weighting said entities according to an hierarchy of fitness according to said property, selecting said first population as a sampling from said weighed entities and pairing said entities and step (B) comprises executing a genetic algorithm with a processor on said binary string to produce a binary string representing said second population of entities.

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14. " The method of claim 1, further comprising forming said second population of entities by steps of:

providing a first reactant system at least partially embodied in a liquid; and

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contacting the liquid with a second reactant system at least partially embodied in a gas, the second reactant system having a mass transport rate into the liquid wherein the liquid forms a film having a thickness sufficient to allow a reaction rate that is essentially independent of the mass transport rate of the second reactant system into the liquid.

40. " A method of selecting a carbonylation catalyst, comprising:

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(A) forming a first population of prospective carbonylation catalyst entities and detecting a property of each of said entities; and

(B) executing a genetic algorithm based on said property of said entities to identify a second population of prospective carbonylation catalyst entities.

#### REMARKS

Claims 1 to 41 are pending. Applicant confirms his election of the Group I claims 1 to 33 and 40 and Species A-1.